

FIG. 1.—The writer's gynæcological operating table. The frame work and supports are of brass while the top is a thick polished glass plate. At one end is the seat for the anaesthetizer, and at the other a low rest for the patient's feet. Both the seat and the foot-rest are turned under the table when out of use.



2.

GYNÆCOLOGICAL TECHNIQUE.

A BRIEF SUMMARY OF THE PRINCIPLES INVOLVED, AS WELL AS THE TECHNIQUE OF THE GYNÆCOLOGICAL OPERATIONS PERFORMED IN THE JOHNS HOPKINS HOSPITAL. THE SIGNIFICANCE OF THE OPERATION AND ITS TECHNICAL SURROUNDINGS TO GYNÆCOLOGICAL PRACTICE.¹

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OUTLINE.

- I. The significance of the preparations made for an operation, and the dangers of insufficient preparation.
- II. The preparation of the patient.
- III. The operating room. The preparation of instruments, ligatures, sponges, dressings.
- IV. The preparation of the operator, the assistants and the nurses.
- V. A general view of the operation as performed in view of such preparation.

I. It is the common observation of every older graduate in medicine that within two decades gynæcology has developed from a specialty of palliative topical treatments, into the most active operative specialty within the range of the medical sciences.

This observation is undoubtedly justified by the facts, and we must at the very outset concede that without the gynæcological operation the whole specialty would again sink to the level of its former insignificant position of palliative treatment working for the most part in the dark. The significance of the operation and the

¹ This paper is an abstract of the last lecture delivered in the winter course of Gynæcology 1891-92, in the Johns Hopkins Hospital.

technique of the preparation are therefore *paramount*, and I speak of "the operation and the technique" as one, with the definite intent of attracting your attention to the *technique* as fully equal in importance to the *operation* itself.

A good operator, with preparations deficient in the points I shall shortly dwell upon will sacrifice lives and wreck the health of many patients, far more than the poor operator who is duly prepared. I cannot emphasize this fact too strongly upon every student of gynæcology.

Look at the question from an historical standpoint. Thirty years ago, only the most skilful operators ventured to open the abdominal cavity, and yet these able surgeons lost from twelve to twenty-five per cent. of the most favorable cases—in the extirpation of ovarian tumors, not to mention the frightful mortality of such operations as abdominal hysteromyomectomy and Cæsarean section. Almost all of this sacrifice of life was due to *deficiencies in the technique*.

To-day the poorer operators do not lose such a percentage of all their cases combined, including many which would have been thought by our predecessors to be absolutely inoperable, while the better operators do not lose more than eight or ten per cent., taking their cases as they come, the desperate with the easy, grouping pus cases, hysteromyomectomies, and Cæsarean sections, all in a heterogeneous class. It is the *improved technique* which has thus given the advantage to the gynæcologists of our day, and emboldened surgeons everywhere to undertake these operations.

In what then does this improved technique consist? Is it that which we have been striving to make it for the past twenty years, some particular entity, a substance of some sort, a drug which can be applied with such great life-saving force to every patient? Fortunately for the evolution of scientific surgery it is not; it is simply a *principle* constantly under process of evolution; its application in the technique of to-day is far different from that of ten or even five years ago, and yet the living principle has always remained precisely the same, the only difference being in the method of applying it.

I speak with positive assurance when I say that this same *principle* has animated the work of every successful man cultivating this field, and this in spite of the fact that we have even been witnesses of the distressing spectacle of prominent men denouncing each other's work in bitter terms; the misunderstanding being due to the fact that both were *carrying out exactly the same principle*



FIG. II.—The patient ready for operation on the table, the lower part of the abdomen is protected by gauze, the chest and thighs covered by sterilized towels, and the legs and feet wrapped up in a blanket and sheet. The feet rest upon a hot water bag. The upper part of the patient's face is protected while the anæsthetizer is giving chloroform. The hips rest upon the author's ovariotomy pad, which drains at the side into the large agate-ware receiver.





FIG. III.—The north-east corner of the new gynaeceological operating room, the distilled water reservoirs to the left, the steam sterilizers in the corner and the sink for washing instruments and dishes to the extreme right.





FIG. IV.—The assistant in the act of placing the instruments, enclosed in a stout linen bag, in the sterilizer. The bag facilitates the handling. The top of the sterilizer ought to be held in the hand.



in different ways. Had they not been under the guidance of this ruling principle, their work would at once have reported the difference in the return of a large death rate, closely approximating that of the earliest abdominal surgeons.

Antisepsis is the cardinal principle.

The greatest advances in abdominal surgery are due to the antiseptic regime. Without a thorough familiarity with this principle and a clearly defined plan by which he proposes to carry it out, no man has a right so much as to pick up a knife with the intention of performing even the smallest operation.

Do not confuse the terms antisepsis and asepsis. Some idle talk has been indulged in by American and English surgeons about not believing in antisepsis, but practicing asepsis. There is no such thing in surgery as asepsis (the condition of being sterile), without a previous application of antisepsis (or the process of sterilization.)

The antiseptic principle is therefore applied—

II. In the preparation of the patient for the operation.

III. In the preparation of the operating room, instruments, ligatures, sponges and dressings.

IV. In the preparation of the operator, assistants and nurses for their various duties connected with the operation.

V. In the consistent application of this principle with all these factors working harmoniously together throughout the operation.

The following is a brief outline of my methods in the Johns Hopkins Hospital.

II. THE PREPARATION OF THE PATIENT.

For several days before operation the patient receives warm baths, softening and quickening the action of the skin, the bowels are well moved every day, and from eighteen to twenty-four hours before, a brisk purgative is given completely emptying and contracting the intestines. Neglect of this precaution may lead to such embarrassment from distended intestines that it will prove necessary to abandon an operation in its earliest stages.

The diet is limited to soft food for at least two days beforehand. If the operation is to take place in the morning, a cup of tea or bouillon is given not nearer than three hours beforehand. A dose of morphia gr. $\frac{1}{4}$ - $\frac{1}{3}$, with bismuth subnit. gr. xx. to xl. are often given a half-hour before the operation, quieting the patient, facilitating anæsthesia and contracting the intestines.

The urine must be carefully analyzed for albumen and sugar. I would not perform any abdominal operation upon a diabetic.

Albuminuria is not a contraindication when not indicating a high grade of nephritis. He who refuses to operate upon patients because of the presence of albumen in their urine will lose many of his best opportunities; much of the albuminuria in women depends upon their pelvic disease for its exciting cause, this is particularly true in the case of large tumors where the albumen is purely symptomatic, disappearing soon after the tumor is removed.

Even the presence of a few casts or some pus in the urine, although more serious, by no means contraindicates an operation in every instance. All such cases should be subjected to a patient searching analysis for grave renal lesions, devoting especial attention to the previous history. Further let me add a caution, I have several times thought that I had lost patients from nephritis after operation, where a persistent marked trace of albumen in the urine had been noted beforehand, but the autopsy revealed no renal disease whatever. The toxic symptoms of some forms of peritonitis are not unlike uræmic intoxication.

To continue the preparation, the vagina must always be carefully douched with a solution of boric, or a weak solution of carbolic acid twice a day for several days beforehand. If hysterectomy is to be performed, the vagina must be vigorously cleansed and disinfected and an iodoform-gauze pack inserted.

It is important to scrub and cleanse the abdominal walls with especial care, removing the superficial epithelium with soap and warm water as well as shaving the pubes, the day before the operation.

When put upon the operating table [Fig. 1.] the assistant must again independently of all previous preparations thoroughly cleanse the abdomen, if that is to be the seat of operation, by scrubbing with soap and warm water, and cleansing it with alcohol and ether.

Before undertaking this, his own hands should have been sterilized as described below.

The patient thus prepared lies upon a flat table, upon the author's ovariectomy drainage cushion, the chest above and the thighs and knees below are covered by sterilized towels and a large piece of gauze laid over the whole body. The gauze is opened in the middle exposing the field of operation. [Fig. 11.]

For inferior pelvic operations she is placed on the perineal drainage cushion and after thorough cleansing of the vagina the buttocks are protected by a piece of gauze opened in the middle shutting off all but the field of operation.



FIG. V.—The instruments, sponges and ligatures classified in glass dishes, and covered with hot distilled water, placed on the semi-circular table, ready for use at the operation. The tiled floor is well shown.





FIG. VI.—The ligatures on reels, and the silkworm-gut, are preserved in stout glass tubes plugged with cotton, one set of ligatures is in the act of being taken out by the assistant who holds the plug between the fingers of the left hand. The wire box is used to hold the tubes in the sterilizer.



FIG. VII.—The north-west corner of the operating room, showing the ligatures, cotton, rubber tubing and some of the sponges stored away in jars on the upper shelves. On the lower shelves is the glass-ware put away.





III. [a] THE OPERATING ROOM.

The chief object to be kept in view in constructing or selecting an operating room is to see that it shall afford every facility for the sterilization and preservation of the various articles used in the operation, that it shall present a fresh clean appearance in harmony with the antiseptic idea, be easy to clean, and afford an abundant well diffused light for the various operations.

Thus almost any room fifteen feet square or more, and well lighted, can with little alteration be made to meet the requirements.

III. [b] THE PREPARATION OF INSTRUMENTS.

In selecting instruments and devising new ones let simplicity of construction be your guide. This greatly facilitates cleansing them, but do not carry this principle so far as to insist that your instruments must be readily separable into a number of small parts. This notion has been pushed to such an extent as to become a nuisance.

The central idea throughout the preparation of the instruments for an operation is sterilization. The presumption is that every one of these objects is in a state of contamination, and the problem before the surgeon is, what is the simplest germicide, how shall it be employed, and how shall the instruments be stored away after sterilization, if need be, so that they shall remain sterile until required for use? [Fig. iii.]

Water meets all these requirements.

Instruments should be thoroughly washed after an operation in soap and warm water, then sterilized in the steam sterilizer and finally dried and put away in the instrument case. A half-hour before the operation they are taken out of the case and put in a bag and laid in a steam sterilizer. They are removed at the end of the half-hour and classified at once in the glass trays and hot distilled water poured on them when they are ready for use in the operation.

III. [c] LIGATURES, SPONGES, COTTONS.

SILK is used for ligation and suture within the abdomen; it is sterilized in the steam sterilizer, in stout glass tubes or sections of stout glass tubing loosely plugged with cotton.

Placing them in the steam sterilizer for a half-hour on two successive days will be sufficient to make them absolutely sterile. The steam easily penetrates the cotton plug and acts on the silk exactly as if it lay loosely exposed in the sterilizer. Ligatures thus

prepared are afterwards thoroughly corked with cotton when they may be put away and preserved indefinitely.

SILKWORM-GUT is prepared in the same manner.

CATGUT requires different preparation, for water ruins it. My own method is to enclose it loosely in one of my large stout tubes or in a long narrow jar well covered with alcohol, then corking the jar tightly with cotton or fastening down the top, put it in the steam sterilizer for forty minutes. Alcohol boils at 75 c. and in order to raise it to the temperature of boiling water, and prevent its too rapid evaporation, it is necessary thus to enclose it under pressure.

SPONGES.—I now prepare some of my hardier sponges by careful washing in many waters until the water is no longer discolored. Then after immersing them for twenty four hours in a weak solution of hydrochloric acid, two drachms to the pint, to dissolve out the chalky particles, they are put in the sterilizer for twenty minutes. But few sponges will stand this however. The usual method is to transfer them from the hydrochloric acid solution to distilled water, in which they are washed until the water remains clean. They are next immersed in a 1-1000 bichloride solution for twelve hours.² They are taken from this and rinsed in warm distilled water and then put in large lots in big jars in a three per cent. solution of carbolic acid.

The ABSORBENT COTTON used, and the TOWELS and BANDAGES are not medicated but are sterilized in the same way, in the steam sterilizer; they are put in a half-hour before the operation, to be taken out when needed.

IV. THE PREPARATION OF THE OPERATOR, HIS ASSISTANTS, AND THE NURSES.

General personal cleanliness enforced by frequent bathing and clean linen and fresh clothes must be consistently and constantly maintained.

The personnel of my operating room all wear specially prepared washed linen suits, put on clean every operating day.

The operator takes a full bath before beginning the morning's work.

Most important of all preparatory procedures is the active cleansing of the hands and forearms immediately preceding the

²This is the only use made of the bichloride, and its inconsistency as it stands in relation to the rest of the technique is apparent, nevertheless I have as yet been unable to devise a better method.



FIG. VIII. Sterilized towels, sponges and cotton in large reservoirs, the towels and sponges are preserved in a three per cent. carbolic solution. The sponges are in the middle jar.

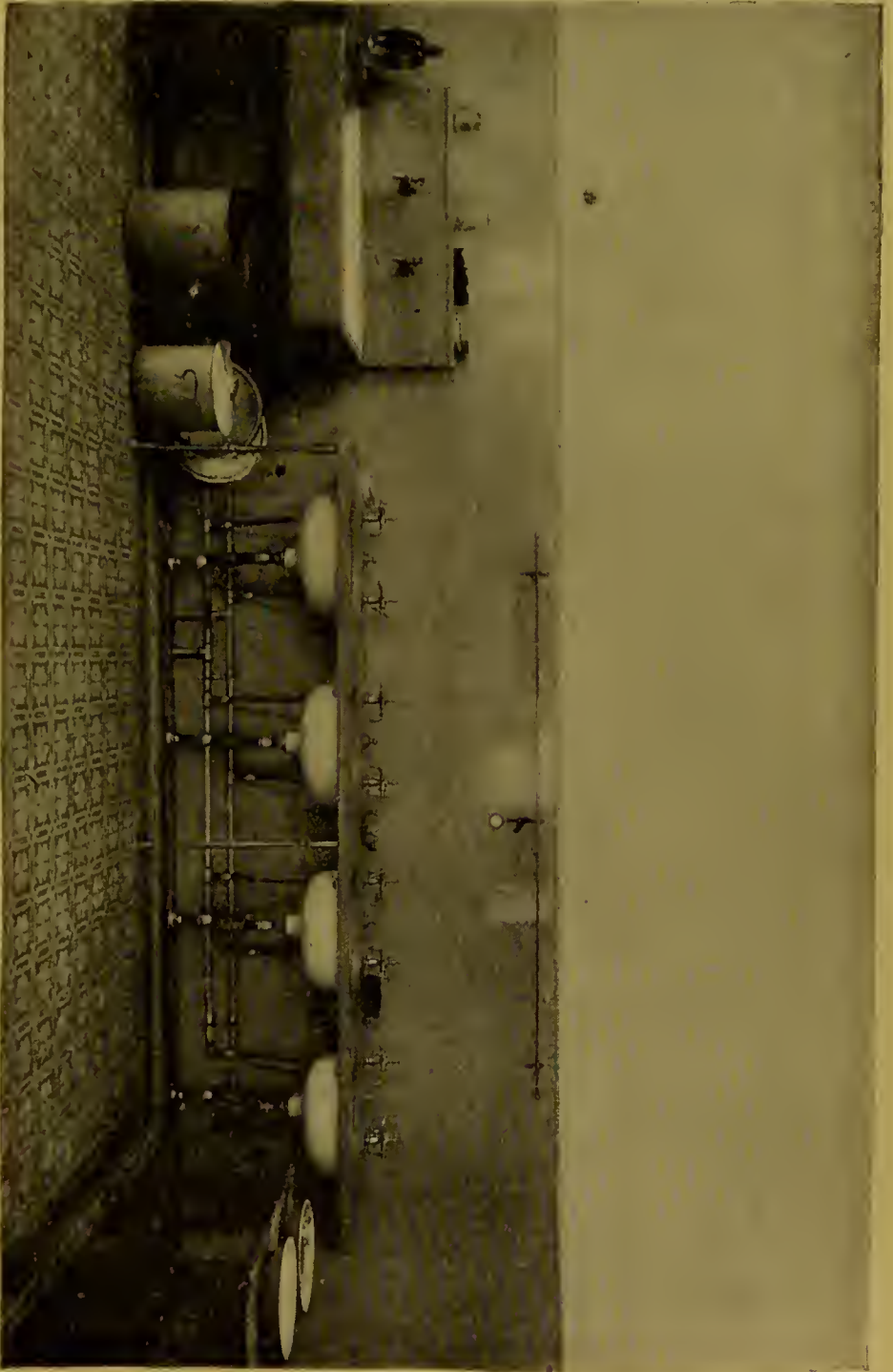


Fig. IX.—The south-east corner of the operating room, showing the sink at the left (same as seen in Fig. 3 at the extreme right) and oval basins for washing hands, with abundant sterile (non-pathogenetic) hot and cold water supply.



FIG. X.—The assistant in the concluding steps of sterilizing hands and forearms, preparatory to operation. The hands and arms are seen stained a deep mahogany color by saturated solution of permanganate of potash.



FIG. XI.—The final step in this method of disinfection, the removal of the permanganate stain by oxalic acid. The decolorization of the left arm is clearly seen.

operation. This is the first duty which the operator, assistants and nurses have to perform on entering the room, to get rid of the contamination, brought in from the outside in the thousand contacts of daily life and vocation, by thoroughly cleansing hands and forearms. Let me interpolate moreover that the duty of cleanliness and preparing for an operation does not begin here upon entering the operating room, but it constantly devolves upon such people as have to deal with surgical cases at all times to shun every unnecessary contact with septic material, and when such contact is unavoidable to cleanse the hands thoroughly at once whenever and wherever it may be.

The hands and forearms are scrubbed with brushes taken from the sterilizer, for ten minutes with oleine (common brown kitchen) soap and hot water, until they appear absolutely clean and of a healthy whitish-pink color. The nails which are kept from one-half to one millimetre long, must be scrubbed with especial care, until they present a clean white subungual space. Although the nails now appear clean, they are not so in a surgical sense, for I can demonstrate constantly the presence of innumerable coccal colonies in hands which have not received any more preparation than this. This is but the first and the chief step in the cleansing, the next is further sterilization by immersion in a saturated solution of permanganate of potash staining them a deep mahogany color, when they are at once transferred to a hot saturated solution of oxalic acid which removes the permanganate. This latter is a strong and valuable germicide, much more powerful than the permanganate alone.

It is finally necessary to remove the oxalic acid by rinsing the hands thoroughly in sterilized water.

After this initial washing it will often be necessary to return to the wash-basin before the beginning of the operation to remove the contamination of various necessary later contacts with substances not known to be sterile, such as occur in handling the patient, lifting dishes, taking off lids, etc., etc. This kind of contamination is but superficial and probably non-infectious, it is readily removed by a brief vigorous scrubbing with soap and water, lasting not more than ten or fifteen seconds.

You must note at this point that from the standpoint of the operator and his assistants in the operating room there are three grades of objects in the septic scale, first all the world outside the operating room, and everybody and everything coming into the operating room from the outside, are regarded as septic until subjected to the special cleansing processes described. Secondly, in

the operating room itself are the other two classes of substances, the room itself, its floor, its walls and its fixtures, and all those objects with which but occasional or indirect contacts occur, are in a suspicious or doubtful condition, to be avoided as far as possible. We deny that there are any septic, pathogenic germs in this room, but we constantly avoid all unnecessary contacts with objects not especially prepared and directly concerned with the operation. The effect of unavoidable contacts in this field is at once removed by a brief scrubbing with soap and water as described above.

These contacts must be limited exclusively to the period of preparation for the operation ; after the operation has begun such contacts are inexcusable. Then only articles and substances of the third category are touched ; these are known to be bacteriologically sterile. In this field are included all the ligatures, instruments and sponges, the operator's hands, the dishes in use, and the water filling them, as well as the patient's abdomen and the gauze and towels covering it, each and all of which have been subjected to special active antiseptic preparations. In case of an emergency arising, calling for the use of the cautery, aspirator, etc., a number of sterile gauze holders about six inches square and six or eight layers thick are kept within easy reach to obviate the necessity of taking the handle directly from the hand of the nurse.

Animated by these principles, the operator will then give all his patients the benefits of the highest achievements of modern scientific surgery in thus translating in a practical form the most recent acquirements of the bacteriological laboratory.

Sepsis may not be altogether excluded, but it will almost without exception be limited to those cases in which it already existed within the patient before the operation, and could not be completely removed by the operation.



FIG. XII.—The operating table with drainage cushion upon it. To the right are the instruments arranged in dishes, to the left are the ether, alcohol, soap and water, preparatory to washing out the abdomen when the patient is put on the table.



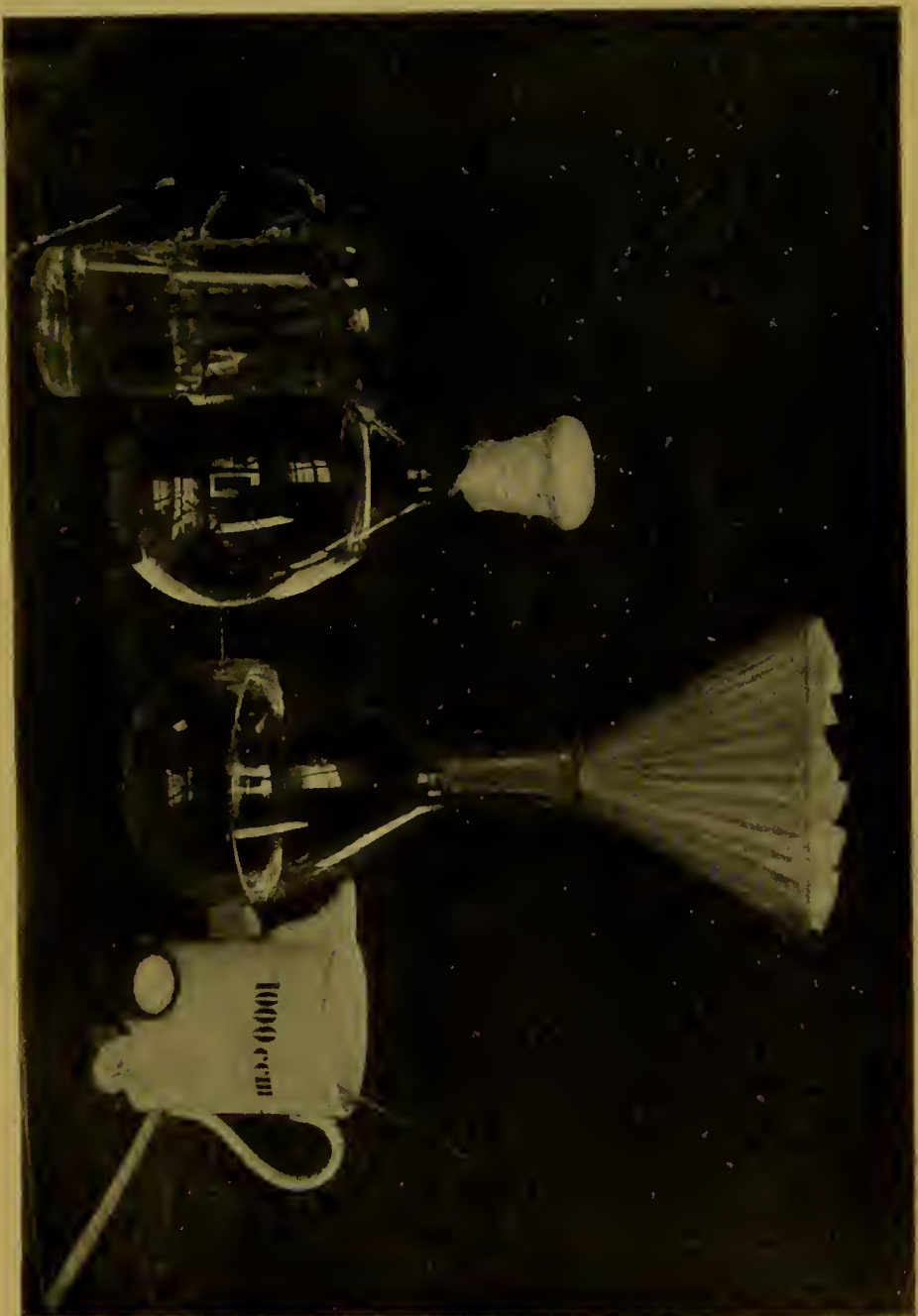


Fig. XIII.—Sterilized salt solution, used in washing out the abdomen, in the bottle corked with cotton. Cubic centimetre measure to the right, graduated measure containing thermometer for bringing salt solution up to 112° F. to the left. The solution is filtered before use as shown in the flask next to the c. c. graduate.





FIG. XIV.—The operation under way after all preparations have been concluded, the rules detailed in the text being in force. The assistants are in their respective proper positions for an abdominal operation. The patient is covered with cloths except a slit opened over the linea alba. One assistant is giving the chloroform seated at the patient's head, the operator stands to the left; OP, site to him, stands the chief assistant, both engaged in making the abdominal incision. The second assistant is preparing the ligatures.

